



## Sorting Quadrilaterals

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<b>Curriculum Area</b>	Mathematics
<b>Subject Area</b>	Geometry/Quadrilaterals
<b>Grade Level</b>	10 <sup>th</sup> grade
<b>Learning Objectives</b>	<ul style="list-style-type: none"> <li>• The student will investigate and identify the properties of various quadrilaterals.</li> <li>• The student will sort quadrilaterals into appropriate categories.</li> <li>• The student will work in cooperative groups to design a database to organize their information.</li> </ul>
<b>Correlation to the SOL</b>	Math G.8 C/T 12.2
<b>Video/Technology Hardware/Software Needed</b>	<p><b>For class:</b> Computer Computer Projection System Database software (such as <i>Microsoft Access</i> or <i>ClarisWorks</i>) Overhead Projector</p> <p><b>For each group of 4 students:</b> Computer connected to printer Database software (such as <i>Microsoft Access</i> or <i>ClarisWorks</i>)</p>
<b>Materials Required</b>	<p><b>For class:</b> An overhead transparency copy of the Quadrilateral Table worksheet Overhead transparency pen</p> <p><b>For each student:</b> A copy of the Quadrilateral Sorting Pieces worksheet A copy of the <a href="#">Quadrilateral Table worksheet</a> A copy of the Using a Database to Sort Quadrilaterals worksheet A copy of the <a href="#">Evaluation Rubric</a></p>
<b>Procedures/Activities</b>	<ol style="list-style-type: none"> <li>1. Give students the Quadrilateral Table and Quadrilateral Sorting Pieces worksheets. Have students list all quadrilaterals that appear to have each property.</li> <li>2. Use a Think-Pair-Share format. Allow students to pair up and compare answers. Then a pair will find another pair and make a group decision. Groups will be told to refer to quadrilaterals by letter rather than labels, and to defend their answers.</li> <li>3. Use the overhead transparency copy of the Quadrilateral Table worksheet.</li> </ol>

	<p>Have the various groups report on their conclusions, and write these on the overhead sheet. As a whole class, discuss a) What properties had identical lists and why? b) What answer lists were subsets of another answer list?; c) What letter appears the most? What letter appears the least?</p> <ol style="list-style-type: none"> <li>As the students to give proper names to the quadrilaterals.</li> <li>Have the students develop a definition for “kite.” Lead them to discover its properties (definition: a quadrilateral with 2 pair of consecutive congruent sides, but not all congruent sides; properties: one pair of congruent opposite angles, diagonals are perpendicular).</li> <li>Lead a brief discussion on databases and how they work. Help the students make the connection between the way they must think to categorize a quadrilateral and how to program a computer to do it.</li> <li>As a whole class, demonstrate how to create the following fields:        Quadrilateral Number (Field Type: Text)        Exact number of pairs of parallel sides (Field Type: Number)        Diagonals Bisect? (Field Type: Yes/No)</li> <li>Ask the students to suggest the fields they feel are needed to enable the computer to provide the class with a list of all parallelograms. What criteria are used for each field?</li> <li>Form cooperative groups of 4 students, balancing between students who have high and low technology knowledge and those who have high and low geometry knowledge. The groups will have the following jobs: Timekeeper and Go ‘fer, Keyboard Operator, Encourager, Print Out Coordinator.</li> <li>Each group creates their own version of the database and saves it to “Group’s Name” Table.</li> <li>Each group will print a table and Print Out Coordinator will turn it in.</li> <li>Each group will design a query to categorize :           <ol style="list-style-type: none"> <li>All trapezoids</li> <li>All non-parallelograms</li> <li>All isosceles trapezoids</li> <li>All rectangles</li> <li>All rhombuses</li> <li>All squares</li> <li>All kites</li> </ol>           The group may need to add or change some of the fields.         </li> <li>Each team saves their queries under their group name.</li> <li>Each group will print another table and the Print Out Coordinator will turn it in.</li> <li>Each student will complete the Using a Database to Sort Quadrilaterals worksheet on his/her own.</li> </ol>
<b>Content Assessment</b>	The Using a Database to Sort Quadrilaterals worksheet serves as an effective evaluation.
<b>Technology Integration Assessment</b>	Have students create fields in a database and design a form for data entry. Each student will create a query to isolate parallelograms, trapezoids, non-parallelograms, rectangles, rhombuses, squares, isosceles trapezoids, and kites. Use the attached Rubric to evaluate this activity.
<b>Extensions</b>	<p><b>Science:</b> Have students find the shapes they have studied in natural objects and manmade objects. Study why these shapes are useful.</p> <p><b>History:</b> Have students develop a database for the various aspects of comparative world cultures, such as religion type, government type, etc.</p>

## Quadrilateral Table

1. Has 4 right angles	
2. Has exactly one pair of parallel sides	
3. Has two pair of opposite sides congruent	
4. Has 4 congruent sides	
5. Has two pair of opposite sides parallel	
6. Has no sides congruent	
7. Has two pair of adjacent sides congruent, but not all sides congruent	
8. Has perpendicular diagonals	
9. Has opposite angels congruent	
10. Is concave	
11. Is convex	
12. Its diagonals bisect one another	
13. Has four sides	
14. Has four congruent angles	
15. Has four congruent sides and four congruent angles	

## Evaluation Rubric

Grade	Database	Queries
A	Complete and accurate	Correctly designed 6 or more
B	Complete and accurate	Correctly designed 4 or 5
C	Complete and accurate	Correctly designed 3
D	Minor errors in database	Correctly designed at least 2
E	Major errors in database	No correct queries